PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-331526

(43)Date of publication of application : 21.11.2003

(51)Int.Cl. G11B 20/12
G11B 20/10

(21)Application number : 2002-134747

(22)Date of filing : 09.05.2002

(71)Applicant : SONY CORP
PIONEER ELECTRONIC CORP

(72)Inventor : ARITOME KENICHIRO
MATSUNO KATSUMI
YOSHIOKA SHINGO
SUGINO AKINOBU

(54) OPTICAL DISK RECORDING METHODOPTICAL DISK RECORDING APPARATUSAND INFORMATION RECORDING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an optical disk recording apparatus capable of recording even a file of a still picture or the like other than a moving picture on an optical disk and attaining free space recording by managing a free space to thereby record information to the free space from which information having been recorded in optional recorded areas is deleted.

SOLUTION: The optical disk recording apparatus manages a DVD video file of a DVD-RW medium adopting the ROW (restricted over write) system by using a temporary VMGI (TMP-VMGI)manages an extended file such as a JPEG file

other than the DVD video file by a intermediate management information (TMP-EXTI)adds free area management information (TMP-SBM) used for the UDF (universal disk format) or the like to the temporary VMGI (TMP-VMGI) to thereby manage free areas even when extension files such as the DVD video file and the JPEG file are recorded in an intermingled wayallows a user to recognize the free areas by the TMP-SBM information and ensures compatibility with a reproduction exclusive optical disk through finalizing processing.

CLAIMS

[Claim(s)]

[Claim 1]It is a record method of an optical disc which makes a group a file with which record is presentedand administrative information on said fileand is recorded on a user's area of an optical discAccording to the attribute of said filea recording format of said file to said user's area and said administrative information is switchedManage the main file by temporary management informationmanage extension files other than the main file using middle management informationand free space where the above-mentioned main file and an extension file are recorded by free space management information is managedAn optical disk recording method characterized by what the above-mentioned main file and an extension file are made intermingledand is recorded on an optical disc.

[Claim 2]A recording format of said file and said administrative informationWhen said file is a file of an animationit is DVD format videoSaid optical disc is DVD-RW (DVD-Recordable)Said file is VTS (Video Title Set) in said DVD format videoSaid management information is VMGI (Video Manager Information) in said DVD format videoWhile managing a DVD video file by temporary VMGI (TMP_VMGI)Extension files other than a DVD video file are managed using middle management information (TMP_EXTI)A record section of a DVD video file and an extension file is managed by free space management information

(TMP_SBM:Temporary SpaceBitmap)The optical disk recording method according to claim 1 recording a DVD video file and an extension file by a ROW (Restricted Over Write) method.

[Claim 3]Have the following and said control means switches a recording format of said file to said user's areaand said administrative information according to the attribute of said fileManage the main file by temporary management informationmanage extension files other than the main file using middle management informationand free space where the above-mentioned main file and an extension file are recorded by free space management information is managedAn optical disk recording device performing control which the above-mentioned main file and an extension file are made intermingledand is recorded on an optical disc.

An administrative information creating means which generates administrative information on a file with which record is presented.

Said file.

A recording device which makes a group said administrative information corresponding to said fileand is recorded on a user's area of an optical disc.

A control means which controls operation of said administrative information creating means and said recording device at least.

[Claim 4]A recording format of said file and said administrative informationWhen said file is a file of an animationit is DVD format videoSaid optical disc is DVD-RW (DVD-Recordable)Said file is VTS (Video Title Set) in said DVD format videoSaid management information is VMGI (Video Manager Information) in said DVD format videoand the above-mentioned control meansWhile managing a DVD video file by temporary VMGI (TMP_VMGI)Extension files other than a DVD video file are managed using middle management information (TMP_EXTI)A record section of a DVD video file and an extension file is managed by free space management information (TMP_SBM:TemporarySpace Bitmap)The optical disk recording device according to claim 3 recording a DVD video file and an

extension file by a ROW (Restricted OverWrite) method.

[Claim 5]A control computer with which an optical disk recording device which makes a group a file with which record is presentedand administrative information on said fileand is recorded on a user's area of an optical disc is equippedAccording to the attribute of said filea recording format of said file to said user's area and said administrative information is switchedManage the main file by temporary management informationmanage extension files other than the main file using middle management informationand free space where the above-mentioned main file and an extension file are recorded by free space management information is managedAn information recording medium on which a control program making it function as a control means which performs control which the above-mentioned main file and an extension file are made intermingledand is recorded on an optical disc was recorded with said control computer so that reading was possible.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the optical disk recording methodoptical disk recording deviceand information recording medium which record information on erasable optical discssuch as DVD-RW (DVD-Rewritable).

[0002]

[Description of the Prior Art]In DVD which is a mass optical discconventionally the optical disc which can write in informationIt is made as [provide / DVD-R (DVD-Recordable) which can be written in onceDVD-RW (DVD-Rewritable) which can be addedand DVD-RAM (DVD-Random Access Memory)]. DVD-R and DVD-RW are made as [play / it / with the optical disk player only for playback] by recording a video data in the format based on DVD-format video

among these optical discs. as [read / by supporting the standard of a universal disc format (UDF:Universal Disk Format) / further again / by computer / by this standard / the data of a disk] -- it is.

[0003]Drawing 11 is a chart showing the logical format of the optical disc by this DVD format video. As shown in drawing 11 (A)the optical disc by this formatAn information storage side is divided into lead-in groove (Lead in)data zone (Data Zone)and the lead-out (Lead out) from the innermost side which is a head sideand a desired video data etc. are recorded on a data zone.

[0004]Here a data zone from the lead-in groove side. It is classified into the UDF (Universal Disk Format) field A1 which is the file system area UDF bridge composition was described to bethe VMG (Video Manager) field A2 which is DVD management information areaand real-time-data recording area A3. A UDF field and a VMG field are administrative information storage fields which manage the file by the video data recorded on this optical disc. The VMG field which is the 2nd administrative information storage field among these UDF fields and a VMG field is a field corresponding to a file manager system peculiar to DVD format video.

The information on TOC which is the administrative information which manages the whole video data recorded on real-time-data recording area A3 is recorded. On the other handthe UDF field A1 which is the 1st administrative information storage field is a field corresponding to the file manager system by a computer. The administrative information which manages the whole video data recorded on real-time-data recording area A3 by the format which plans compatibility with the file system in a computer is recorded.

[0005]Real-time-data recording area A3 is a user's area which records live data. As shown in drawing 11 (B)VTS (Video Title Set) (it is hereafter called a title suitably) is made into a unitand a video data is recorded.

VTS is made as [provide / at the maximum / it / to 99 pieces]. As shown in drawing 11 (C)this VTS from the head side VTSI (Video Title Set information)It is

constituted by VTSM VOBS (Video Object Set for the VTSM)VTSTT VOBS (Video Object Set For Titles in a VTS)and VTSI BUP (Backup of VTSI). The video data based on the format of MPEG(Moving Picture Experts Group) 2 which is live data is recorded on VTSTT VOBSThe title menu of a video data is recorded for the recording position information etc. which are administrative information which manages the video data based on these live data in VTSI on VTSTT VOBS. VTSTT VOBS is OBUSHON. VTSI BUP is backup of VTSI.

[0006]In this kind of optical disc by theseWhen it is made as [reproduce / when accessing by computer / it / the file for which it asks by UDF is searchedand] and reproduces with a DVD playerit is made as [reproduce / it / the file for which it asks by VMG is searchedand].

[0007]As a method which writes a video data in such an optical discit is made as [use / an IncrementalRecording method (it is hereafter called an INC method) and a Restricted Over Write method (it is hereafter called a ROW method)]. An INC method is a method which records a video data sequentially here.

A ROW method is a method applied to the optical disc which can be overwritten. Howeveralso in a ROW methodin recording data on a non-record sectionit records a video data sequentially. In these INC(s) method and the ROW methodit is made as [manage / processing of optical DISUKUHEsuch as a request to print out files] by RMA (Recording Management Area) provided in the inner circumference side of a lead-in groove.

[0008]The record procedure by an INC method is shown in drawing 12. In an INC methodit is defined as the area written in at once being a maximum of threeand Rzoneand a call and each Rzone are managed for these by RMArespectively.

[0009]That isin an INC methodwhen recording an animationas shown in drawing 12 (A)Rzone is reserved first. The UDF field whose request to print out files of Rzone is a record section of administrative information hereTo the non-record section which defines the field of Rzone1 which forms a VMG fieldand forms real-time-data recording area continuously. The field of Rzone2 which forms VTSI of top VTS and VTSM VOBS is definedthe non-record section which remains is

defined as the field of Invisible Rzoneand it performs. The INC method is made as [secure / the field which secures the record section of administrative information and forms VTSI of top VTSand VTSM VOBS by request to print out files of this Rzone1 and Rzone2].

[0010]In an INC methodVTSTT VOBS by live data is formed by recording a video data one by one from the head side of Invisible Rzone. Furthermorewith a user's directionsif record of live data is completed about one titleas shown in drawing 12 (B)As VTSI BUP is recorded following record of these live data and it is shown in drawing 12 (C)it returns to the head sideVTSI and VTSM VOBS are formed in Rzone2and Rzone2 is closed. In an INC methodthis records one VTS on an optical disc.

[0011]In an INC methodwhen recording the following title continuouslyas shown in drawing 12 (D)Rzone3 is reserved to the remaining non-record sectionthe field of VTSI and VTSMVOBS is secured in itand Invisible Rzone is defined as it. Thenas shown in drawing 12 (E)after forming VTSTT VOBS by record of live dataVTSI BUP is formedand as shown in drawing 12 (F)VTSI and VTSM VOBS are formed in the field secured previously. Therebywith an optical discas shown in drawing 12 (G)continuing VTS is recorded. In an INC methodwhen recording a title succeedinglya non-record section is defined similarly and VTS is recorded one by one.

[0012]On the other handin [optical disc / which records VTS one by one in this way / in which it comes to form real-time-data recording area] an INC methodAs shown in drawing 12 (H)a UDF field and a VMG field are formed by processing of a FAINA risea lead-in groove and lead-out are formed furtherandtherebycompatibility with the optical disc only for playback is planned. In formation of this UDF field and a VMG fieldfrom VTSI of each titleand the data of VTSM VOBSthe data of UDF and VMG is generated and it performs by recording this data on Rzone1 and closing Rzone1.

[0013]Nextthe record procedure by a ROW method is shown in drawing 13. In a ROW methodas shown in drawing 13 (A)a lead-in grooveUDFVMGVTSI of a

head titleand the record section of VTSM VOBS are secured a priori by padding. Padding is processing which records dummy datasuch as NULLand secures a field here.

[0014]Thusin [if these fields are secured] a ROW methodAs shown in drawing 13 (B)by recording a video data one by oneIf VTSTT VOBS by live data is formed and record of live data is completed about one titleas shown in drawing 13 (B)ThenVTSI BUP is recorded and processing of padding is performed for reservation of VTSI of the title which continues furtherand the record section of VTSM VOBS. It returns to the head side continuouslyand as shown in drawing 13 (C)VTSI corresponding to record of these live data and VTSM VOBS are formed. In a ROW methodthis records one VTS on an optical disc.

[0015]In [when recording the following title continuously] a ROW methodAs shown in drawing 13 (D)following the field of padding formed by the last VTSVTSTT VOBS and VTSIBUP are formed by record of live dataand processing of padding is performed for reservation of VTSI of the continuing titleand the record section of VTSM VOBS. Thenas shown in drawing 13 (E)VTSI and VTSMVOBS are formedand this records continuing VTS on an optical discas shown in drawing 13 (F). In a ROW methodwhen recording a title succeedinglyprocessing of padding etc. is performed similarly and VTS is recorded one by one.

[0016]On the other handin [optical disc / which records VTS one by one in this way / in which it comes to form real-time-data recording area] a ROW methodAs shown in drawing 13 (H)a UDF field and a VMG field are formed by processing of the same FAINA rise as an INC methoda lead-in groove and lead-out are formed furtherand it is made as [plan / by this / compatibility with the optical disc only for playback].

[0017]

[Problem(s) to be Solved by the Invention]By the waygenerallywhen carrying out DVD-format video recordthe file system which manages an intermediate state is needed for DVD-RW media. Since the information which manages VTS will be

held also at the file system of an intermediate state if it is record of only a DVD-video standardwhen VTS is deletedit is managed although which LSN (LogicalSector Numbers) on media was vacant. It becomes possible using this information to newly record on the position concerned.

[0018]For examplewhen recording information on DVD-R in accordance with real timethe art which records information as it is possible to reproduce also by the player for DVD only for reproduction on which information was recorded regardless of real time is indicated by JP14-063765A. VTS which contains VOBS which should be reproducedand the VTSI concerned in this indication artWhen recording information on DVD-Rbeing based on the DVD video specification constituted including VMGI for controlling reproduction of 1 or two or more VTS(s) at leastRecord VTS on DVD-R and temporary VMGI which is the temporary control information for corresponding to the recorded VTS concernedand forming VMGI later and recording on DVD-R is generated after record of VTSGenerated temporary VMGI is recorded on the DVD-R concernedwhenever VTS is recorded on DVD-R. Thusby generating temporary control information and recording on the added type recording medium of a postscript temporarilywhen unit recorded information is recordedBy recording original supervisory control information correctly later using the temporary control information which has the newest contentseven if it is a case where two or more unit recorded information is recorded in the added type recording medium concerned of a postscript. Information storage which met at the real time over the added type recording medium of a postscript based on the recording format for reproduction exclusive recording media on condition of the information storage which met at real time can be performed.

[0019]Howeverthere is a demand of liking to also record extension filessuch as JPEG files other than a DVD video fileon DVD-RW media.

[0020]For examplesuch an optical disc can consider replacing with magnetic tape and applying to a portable camera integral-type VCR. In this casein the conventional portable camera integral-type VCRwhen some are recordable not

only about an animation but a still picturealso in this kind of optical disca thing recordable about still pictures other than an animationetc. is desired.
[0021]Also when such an extension file is held to a middle file systemthe management information for getting to know a certain space condition of use is required.
[0022]There is a problem that mounting which does not correspond to an extension file does not understand anymore from which LSN I may next start record.
[0023]Thenin view of the conventional problem like ****the purpose of this invention is recordable also about filessuch as still pictures other than an animationand manages empty spaceIt is in providing the disk recording methoddisc recording deviceand erasable optical disc which enabled crevice record which records information on the empty space which deleted arbitrary recorded fields.
[0024]
[Means for Solving the Problem]As shown in drawing 1 (A) in DVD-RW media of a ROW methodwhile managing a DVD video file by temporary VMGI (TMP_VMGI) in this inventionAs extension filessuch as JPEG files other than a DVD video fileare managed using middle management information (TMP_EXTI) and it is further shown in drawing 1 (B)By adding free space management information (TMP_SBM:Temporary SpaceBitmap) used by UDF etc. to temporary VMGI (TMP_VMGI)As free space can be known by TMP_SBM also when make extension filessuch as a DVD video file and a JPEG fileintermingledit recordsfree space is managed and an extension file is deletedand shown in drawing 1 (C)It enables it to secure compatibility with an optical disc only for playback by processing of a FAINA rise.
[0025]Namelythis invention is a record method of an optical disc which makes a group a file with which record is presentedand administrative information on said fileand is recorded on a user's area of an optical discAccording to the attribute of said filea recording format of said file to said user's area and said administrative

information is switchedManage the main file by temporary management informationmanage extension files other than the main file using middle management informationand free space where the above-mentioned main file and an extension file are recorded by free space management information is managedThe above-mentioned main file and an extension file are made intermingledand it records on an optical disc.

[0026]An administrative information creating means which generates administrative information on a file which presents record with an optical disk recording device concerning this inventionA recording device which makes a group said file and said administrative information corresponding to said fileand is recorded on a user's area of an optical discHave at least said administrative information creating means and a control means which controls operation of said recording deviceand said control meansAccording to the attribute of said filea recording format of said file to said user's area and said administrative information is switchedManage the main file by temporary management informationmanage extension files other than the main file using middle management informationand free space where the above-mentioned main file and an extension file are recorded by free space management information is managedControl which the above-mentioned main file and an extension file are made intermingledand is recorded on an optical disc is performed.

[0027]A control computer with which an optical disk recording device which an information recording medium concerning this invention makes a group a file with which record is presentedand administrative information on said fileand is recorded on a user's area of an optical disc is equippedAccording to the attribute of said filea recording format of said file to said user's area and said administrative information is switchedManage the main file by temporary management informationmanage extension files other than the main file using middle management informationand free space where the above-mentioned main file and an extension file are recorded by free space management information is managedIt comes to record a control program making it function as

a control means which performs control which the above-mentioned main file and an extension file are made intermingledand is recorded on an optical disc with said control computer so that reading is possible.

[0028]

[Embodiment of the Invention]Hereafterit explains in detailreferring to drawings for an embodiment of the invention.

[0029]This invention is applied to the optical disk recording / playback equipment 100 of composition as shownfor example in drawing 2.

[0030]This optical disk recording / device 100 are portable camera integral-type VCRsand records an image pick-up result on the optical disc 2 of DVD-RW (DVD-Rewritable) which can be added by a ROW method.

[0031]This optical disk recording / playback equipment 100The video input section 3the audio input part 5the compression / elongation processing part 6the header information treating part 7the random access memory (RAM) 9 and 15the system controller 10the final controlling element 11the monitor section 12the video/audio encoder 13the DVD signal processing part 14It has the analog-front-end part 16the motor drive control section 18the optical head 19the spindle motor 20and thread motor 21 grade. Above-mentioned compression / elongation processing part 6 consist of the video processing section 61the audio processing part 62and the multiplex processing section 63.

[0032]The video signal which is an image pick-up result obtained from the imaging means which the video input section 3 does not illustrate in this optical disk recording / playback equipment 100Or by changing into a digital signal the video signal inputted from an external instrumenta video data is generated and compression / elongation processing part 6the monitor section 12and the video/audio encoder 13 are supplied. The image pick-up result according to an animation by control according [a built-in imaging means] to the system controller 10Or it is made as [output / the image pick-up result by a still picture]andtherebythis video input section 3 is made according to control of the imaging means by the system controller 10 as [input / the video data based on

an animation or a still picture / selectively].

[0033]By changing into a digital signal the audio signal acquired with a microphoneor the audio signal by an external inputthe audio input part 5 generates audio informationand supplies it to compression / elongation processing part 6the monitor section 12and the video/audio encoder 13.

[0034]Operation is switched by control of the system controller 10and at the time of recordusing the random access memory 9compression / elongation processing part 6 carries out the data compression of a video data and the audio informationcarries out multiplexing processingand outputs them to the header information treating part 7. After dividing into a video data and audio information the data obtained from the header information treating part 7 using the random access memory 9 at the time of playbackdata decompression is carried outrespectively and it outputs to the monitor section 12and the video/audio encoder 13.

[0035]That isin compression / elongation processing part 6at the time of recordthe video processing section 61 carries out the data compression of the video data outputted from the video input section 3and outputs it by control of the system controller 10. To carrying out a data compression by the format of MPEG 2when a video data is an animation at this timewhen a video data is a still picturea data compression is carried out by the format of JPEG (Joint Photographic Coding Experts Group). At the time of reproductioncorresponding to the data compression formatthe video processing section 61 carries out data decompression of the video data outputted from the multiplex processing section 63and outputs it. At the time of recordthe audio processing part 62 carries out the data compression of the audio information inputted from the audio input part 5 by the format of MPEGthe Dolbey audioor linear PCMand outputs it. At the time of reproductiondata decompression of the audio information obtained from the multiplex processing section 63 is carried outand it is outputted. At the time of recordthe multiplex processing section 63 carries out time multiplexing of the video data outputted from the video processing section 61and the audio

information outputted from the audio processing part 62and outputs it to the header information treating part 7. At the time of reproductiona video data and audio information are separated from the time multiplexing data outputted from the header information treating part 7and it outputs to the video processing section 61 and the audio processing part 62respectively.

[0036]The video data into which the monitor section 12 is inputted from the video input section 3the audio information inputted from the audio input part 5Or it is constituted by the display mechanism and speech processing mechanism which monitor the video data outputted from compression / elongation processing part 6and audio informationandtherebyis made as [monitor / an image pick-up result and a reproduction result] with this optical disk recording / playback equipment 100.

[0037]Video / audio encoder 13 carries out the data compression of the video data and audio information which are outputted from the video data inputted from the audio input part 5 and audio informationor the compression / elongation processing part 6 by predetermined formatand outputs them to an external instrument. Thereby with this optical disk recording / playback equipment 100it is made as [monitor / with an external instrument / an image pick-up result and a reproduction result].

[0038]At the time of recordthe header information treating part 7 receives the time multiplexing data outputted from compression / elongation processing part 6and adds and outputs header information peculiar to DVDthe header information of an extension fileetc. by control of the system controller 10. Using the information from the system controller 10the data of UDFVMGVTSIetc. is generated and it outputs to the DVD signal processing part 14. At the time of reproductionthe header information added at the time of record is separated from the output data of the DVD signal processing part 14and it outputs to compression / elongation processing part 6. This separated header information is notified to the system controller 10. An extension file is a file which is not defined by the DVD format video which is a format standardized about this optical disc

2and it is made as [apply / to this extension file / the file of a still picture] in this embodiment.

[0039]At the time of recordthe DVD signal processing part 14 uses the random access memory 15from the output data of the header information treating part 7generates an error correction code and adds this error correction code to this output data. Processing of scramble processing8/15 abnormal conditionsetc. is performedand the data row by the processing result is outputted to the analog-front-end part 16 by a serial data stream. furthermore -- the time of reproduction -- the DVD signal processing part 14 -- the time of record -- reverse -- the output data of the analog-front-end part 16 -- decoding processing and descrambling processing -- error correction processing is carried out and a processing result is outputted to the header information treating part 7. For [to which the DVD signal processing part 14 is outputted from the system controller 10] spindle controlDigital-to-analog-conversion processing of the various drive information the object for tracking controlfor focus controland for thread control is carried outthese driving signals are generatedand these driving signals are outputted to the motor drive control section 18.

[0040]The analog-front-end part 16 generates and outputs a light control signal about the laser beam with which the optical disc 2 is irradiated from the optical head 19. As opposed to the analog-front-end part 16 holding the light volume of the laser beam with which the optical disc 2 is irradiated from the optical head 19 with this light control signal to the fixed light volume for playback at the time of playbackAt the time of recordaccording to the output data from the DVD signal processing part 14the signal level of this light control signal is changedand this starts the light volume of a laser beam from the light volume at the time of reproduction intermittently to the light volume of record according to the output data from this DVD signal processing part 14.

[0041]When the analog-front-end part 16 amplifies and carries out data processing of the light-receiving result of the returned light obtained from the optical head 19The regenerative signal with which a signal level changes

corresponding to the pit sequence formed in the optical disc 2 is generatedand the regenerative data which is a binary identification result of this regenerative signal is outputted to the DVD signal processing part 14 by signal processing of this regenerative signal. This data processing generates a tracking error signala focus error signaletc. with which a signal level changes according to the amount of tracking errorsand a focus error amountand these signals are outputted to the system controller 10 with a digital signal.

[0042]The motor drive control section 18 drives a mechanism correspondingrespectively with the various driving signals outputted from the DVD signal processing part 14. That isthe motor drive control section 18 rotates the spindle motor 20 and the thread motor 21 among these driving signals with the driving signal for spindle controland the driving signal for thread control. The actuator of loading in the optical head 19 is driven with the driving signal for tracking controland the driving signal for focus control.

[0043]The spindle motor 20 carries out chucking of the optical disc 2and rotates it with predetermined revolving speed. The optical disc 2 makes the optical head 19 the thread motor 21 move radially.

[0044]The optical head 19 emits a laser beam from a built-in semiconductor laser with the light control signal outputted from the analog-front-end part 16and condenses this laser beam to the information storage side of the optical disc 2 via an object lens. The returned light obtained from the optical disc 2 by the exposure of this laser beam is led to a predetermined photo detector via this object lensand the light-receiving result of this photo detector is outputted to the analog-front-end part 16. do the optical head 19 so that this object lens moves with the actuator driven with the driving signal for tracking controland the driving signal for focus control -- thereby -- tracking control -- it is made as [carry out / focus control]. It is made as [record / the light volume of a laser beam is intermittently risen by a light control signalcarries out the rise in heat of the information storage side of the optical disc 2 locally by thisand / light volume / desired data].

[0045]By the system controller's 10 consisting of a computer which controls operation of this optical disk recording / playback equipment 100 wholeand executing the processing program installed in this optical disk recording / playback equipment 100 a prioriOperation of each part is further controlled by a user's operational input obtained via the final controlling element 11 with the various signals etc. which are detected in the analog-front-end part 16. With namelythe tracking error signal and focus error signal by which the system controller 10 is detected in the analog-front-end part 16. The object for tracking control and the drive information for focus control are generatedand it changes into an analog signal in the DVD signal processing part 14and outputs to the motor drive control section 18and this performs processing of tracking control and focus control. The header information etc. which are detected by the header information treating part 7 detect a laser-beam-irradiation positionfrom this detection resultthe drive information for thread control is generatedit outputs to the DVD signal processing part 14and this performs processing of seeking etc. Processing of spindle control is performed similarly.

[0046]Procedure shown in drawing 3 by starting of a power supply on the assumption that the processing about these optical discs 2 is performed. That isthe system controller 10 will judge the existence of the optical disc 2 from the detection result by the detecting mechanism of the optical disc 2 which moves to step SP2 from step SP1and is not illustratedif a power supply is started. If a negative result is obtained herethe system controller 10 will repeat step SP2. On the other handif it is loaded with the optical disc 2 after starting a power supply further when a power supply is started in the state where it was loaded with the optical disc 2it will move to step SP3 from step SP2 by obtaining an affirmation result by step SP2. In a repetition of this step SP2if a power supply is brought downthe system controller 10 will move to step SP4 directlyand will end this procedure.

[0047]In step SP3the system controller 10About the optical disc 2 by which FAINA rise processing is carried outthe data of VMG is acquired by driving the

thread motor 21moving the optical head 19 to the most inner circumference of the optical disc 2and acquiring the playback result by the side of this most inner circumference from the DVD signal processing part 14. On the other handwhen FAINA rise processing of the optical disc 2 is not yet carried outthe information on RMA is acquired. Using the information on this RMAwhen it is judged that data is already recorded on the real-time-data recording area of the optical disc 2the optical disc 2 is searched and VTSI of each VTS and the data of VTSTT VOBS are acquired. Therebythe system controller 10 is made as [acquire / the administrative information on the optical disc 2 required for the record reproduction of the optical disc 2] like the optical disk unit which carries out record reproduction of the usual DVD.

[0048]In addition to the data of VMGin this processingthe system controller 10 also acquires the data of UDF collectively. In reproduction of real-time-data recording areawhen the middle management information mentioned later is recordedthis middle management information is also acquired collectively. Therebythe system controller 10 is made as [acquire / about the administrative information on this extension file / collectively] also about the extension file which is not defined by DVD-format video more nearly refreshable than the optical disc 2. The system controller 10 is recorded on the memory of built-in of a series of administrative information which was carried out in this way and acquiredand is held.

[0049]Thenif it moves to step SP5it judges whether discharge of the optical disc 2 was directed and an affirmation result is obtained [system controller / 10] hereafter pointing to the loading mechanism which does not illustrate discharge of the optical disc 2it returns to step SP2.

[0050]On the other handif directions other than discharge of the optical disc 2 are obtained from a userIt moves to step SP6 from step SP5and operation of directing operationor (REC showing) and reproduction operation by this user instructs record to beor operation of (PB's showing) and a power supply standing and directing lowering judges [(Power OFF shows) and]. In operation in which

operation by a user directs playback herethe system controller 10 moves to step SP7 from step SP6performs the regeneration procedure which plays the file recorded on the optical disc 2and returns to step SP5.

[0051]On the other handin operation in which operation by a user directs recordthe system controller 10 moves to step SP8 from step SP6performs the recording processing procedure which records an animation or a still picture on the optical disc 2and returns to step SP5. By processing the optical disc 2 so that the optical disc 2 cannot record datawhat is called when FAINA rise processing is carried out and UDF and VMG are formedthe system controller 10 skips a recording processing procedureand returns to step SP5. When it is DVD-RW which can eliminate the optical disc 2 even when FAINA rise processing is carried out in this wayrecorded data is eliminated by a user's check and a recording processing procedure is performed.

[0052]On the other handin operation in which operation by a user brings down a power supplythe system controller 10 moves to step SP9 from step SP6performs processing of power supply **** loweringmoves to step SP4and ends this procedure.

[0053]In the recording processing procedure of the procedure performed by doing in this waythe system controller 10 records the file of an animation or a still picture with a ROW methodwhen the optical disc 2 is DVD-RW.

[0054]Drawing 4 is a chart which takes for an example the case of what is called a virgin disk with which the optical disc 2 is not recording the file at all and with which explanation of the recording processing of a dynamic image file and a still picture file is presented with this ROW method. By updating the information on RMA which acquired the system controller 10 from the optical disc 2and was held in the memoryAs shown in drawing 4 (A)a lead-in grooveUDFTMP_VMGITMP_SBMVTSI of a head titleand the record section of VTSM VOBS are secured a priori by padding. Padding is processing which records dummy datasuch as NULLand secures a field here.

[0055]And by recording a video data one by oneas shown in drawing 4 (B) in

recording an animationIf VTSTT VOBS by live data is formed and record of live data is completed about one titleVTSI BUP will be recorded continuously and processing of padding will be performed for reservation of VTSI of the title which continues furtherand the record section of VTSM VOBS. It returns to the head side continuouslyand as shown in drawing 4 (C)while updating TMP_VMGI and TMP_SBMVTSI corresponding to record of these live data and VTSM VOBS are formed. This records one VTS on an optical disc.

[0056]When recording the following title continuouslythe field of padding formed by the last VTS is followedVTSTT VOBS and VTSIBUP are formed by record of live dataand processing of padding is performed for reservation of VTSI of the continuing titleand the record section of VTSM VOBS.

[0057]HereTMP_VMGI is temporary VMGI recorded with VTSIwhen record of one title is completedand it includes the number of VTS(s) recorded on the diskthe information on a disk namephysical arrangement of VTS for 99 titlesthe information on a title nameetc. This TMP_VMGI is updated by the newest information over all the titles (VTS) recorded so far.

[0058]Even if it is a case where TMP_SBM is not concerned with the existence of an extension file and the structure cannot be understoodAs it is the free space management information described in order to tell a recorded field and is shown in drawing 5It consists of the space bit map management table (TMP_SBM_MAT:Temporary Space Bitmap Management Table) and space bit map information (SBM) which are the management domains of the field of TMP_SBM.

[0059]A space bit map management table (TMP_SBM_MAT) is a table where the bit size of the bit map information which continues next was describedas shown in the following table 1.

[0060]

[Table 1]

[0061]In order to identify that TMP_SBM_MAT is TMP_SBMTMP_SBM_ID which describes "TMP_SPACEBMP" by ISO/IEC646:1983 (a-character) (RBP 0-11)TV_VERN (RBP 12-13)1ECC which describe the version number of TMP_VMGI = it consists of SBM_SZ (RBP 16-19) etc. which describe the effective number of bits of the field of SBM which was 1 bit.

[0062]A space bit map (SBM) expresses the operating condition of an ECC block with a bitas shown in drawing 6. It manages from LSN0 side and expresses with 1 at the time of intact. The effective bits of SBM increase according to the increase in NWA. 0/1 is not asked about the bit besides the range.

[0063]Therebythe system controller 10 is made as [record / one by one / a title]. In being loaded with the optical disc 2 by which a FAINA rise is not yet carried out and adding a postscript to this optical disc 2It is data of RMA acquired by step SP2 of drawing 3and with the data of RMA held in a memoryfrom the end of a recorded title alreadysame processing is performed and the animation which is an image pick-up result by this is added.

[0064]On the other handin processing of a FAINA risethe administrative information which was carried out in this waywas generated and was held in the memory generates UDF and VMGand a lead-in groove and lead-out are generated.

[0065]When a postscript is added to the optical disc 2 by which a FAINA rise is not yet carried outAbout the title already recorded on the optical disc 2UDF about these titles and the data of VMG are generated by VTSITMP_VMGITMP_SBMand VTSTT VOBS which were acquired by step SP3 of drawing 3.

[0066]Thusas VTS is recorded one by one and the optical disc in which it comes to form real-time-data recording area is shown in drawing 4 (H)A UDF field and a VMG field are formed by processing of a FAINA risea lead-in groove and lead-out are formed furtherand it is made as [plan / by this / compatibility with the optical disc only for playback].

[0067]On the other handwhen recording extension filessuch as a still pictureas it

is shown in drawing 4 (D)when the field is secured by paddingThe extension file EF is recorded one by onemiddle management information TMP_EXTI is recordedand the field for title record which continues by padding is secured from the head of this field. Middle management information TMP_EXTI which manages a still picture temporarily to a FAINA rise and which is administrative information is created one by oneand it holds in a built-in memory so that it may correspond to record of this still picture file EF.

[0068]Thenwhen recording an extension filethe system controller 10 repeats record of such extension file EF and middle management information TMP_EXTIand reservation of the field by padding. On the other handlike [when recording an animation continuously] the case where the file of an animation is recorded following the file of an animationas shown in drawing 4 (E) and (F)Following the field of paddingVTSTT VOBS and the field which carries out VTSIBUP record and continues by padding are securedit returns to the head sideand VTSI and VTSMVOBS are formed. This records one VTS on an optical discas shown in drawing 4 (G).

[0069]Here this middle management information TMP_EXTIThe attribution information by the extension which is administrative information required for reproduction of an extension fileand shows the attribute of an extension fileIt is constituted by the address information which shows a recording positionthe information on a file sizethe hour entry recorded on the optical disc 2etc.and as shown in drawing 7it is collectively recorded for every attribute of the extension file recorded continuously. Namelyas shown in drawing 7 (B)middle management information is constituted by a headerand file-management-information DJ for every attributeDM7 and DM4. For exampleas shown in drawing 7 (A)after recording three file FJ1 by JPEGFJ2and FJ3 with a user's directionsThenwhen two file FM71 by MPEG7 and FM72 were recordedit continues further and two file FM41 by MPEG4 and FM42 are recordedmiddle management informationThe recording position of each file-management-information DJ and DM7 which record of these three kinds of files is shown by record of a headerand continue

by record of this headerand DM4 is shown. Numerals DJDM7and DM4 show the file management information by JPEGMPEG7and MPEG4 hererespectively.
[0070]As he shows drawing 7 (C)and file-management-information DJ for every attribute is recorded every management information DFJ1 of each fileDFJ2and DFJ3 and shows drawing 7 (D)It is made as [assign / the attribution information of the extension file corresponding to management information DFJ1 of each of this fileaddress information ADDRthe information on sizea hour entryetc.].
[0071]In this embodimentoptical disk recording / playback equipment 100In the optical disc 2 recorded with this optical disk recording / playback equipment 1 by applying the still picture file by JPEG as this extension fileAbout the file management information for such every attributeonly file-management-information DJ who shows drawing 7 (B) will be created.
[0072]Therebyeven when recording files other than an animation on the optical disc 2the system controller 10 makes a file and corresponding administrative information a groupand records them on a user's area. When the file recorded on the optical disc 2 is a file of an animation at this timeAs opposed to recording that the information for backup on administrative informationa fileand administrative information continues one by oneWhen recording the file of the still picture which are files other than an animation on the optical disc 2a file and administrative information are recorded one by oneandtherebyit is made as [switch / the recording format of administrative information] according to the attribute of a file.
[0073]If the system controller 10 is carried out in this way and middle management information TMP_EXTI is recordedit will record and hold this middle management information TMP_EXTI in a built-in memory. When recording the file by a still picture again after doing in this way and recording middle management information TMP_EXTIthe system controller 10If the operational mode of recording is switched to still picture mode from animation mode and the recording start in still picture mode is directed after recording an extension file one by one in a similar mannerdrawing 4 (D) middle management information TMP_EXTI will be recordedand the field of padding will be formed as shown in

drawing 4 (E). And as shown in drawing 4 (F)following the field of paddingVTSI BUP record is carried outVTSTT VOBS and the field which continues by padding are securedit returns to the head sideand VTSI and VTSM VOBS are formed. As for thisas shown in drawing 4 (G)this records one VTS on an optical disc following middle management information TMP_EXTI.

[0074]It is made as [record / with administrative information / the file by the still picture which is not defined by optical disk recording / playback equipment 100 by these with the file by the animation by DVD format video depending on DVD format video]. About the optical disc 2 to write and which was carried out in this way and recorded in carrying out. In the conventional optical disk unit which supports only DVD format video when real-time-data recording area is searched by RMAOnly VTSI and VTSTT VOBS which are the administrative information on VTS will be detectedand it will not be recognized as a significant file at all about the middle management information on the extension file by the still picture etc. which are not defined at alland an extension file. On the other handin addition to the administrative information on VTSin the optical disk unit which supports this kind of extension fileit will be recognized also about the middle management information on the extension file by these still picturesand an extension file.

[0075]Therebyas the system controller 10 does not affect reproduction of the animation in the conventional optical disk unit at allit is made as [record / an extension file].

[0076]In [if carrying out the FAINA rise of the optical disc 2 to write and which does in this way and records an extension file is directed by the user in carrying out] the system controller 10As shown in drawing 4 (H)the data of UDF is created from the administrative information on all the titles which were carried out in this way and created (VTSIVTSTT VOBS)and the middle management information on all the extension filesand it records on the optical disc 2. The data of VMG is generated only from the administrative information on all the titles (VTSIVTSTT VOBS)and it records on the optical disc 2. In generation of the data of these UDF and VMGit creates from the middle management information etc.

which were held in the memory. If the system controller 10 is carried out in this way and UDF and VMG are recordedit will create a lead-in groove and lead-out. Record of such UDF and VMGa lead-in grooveand lead-out are performed with the output to the DVD signal processing part 14 of creation and the data in which the system controller 10 corresponds about record of middle management information further.

[0077]In this embodimentabout UDF which is the administrative information for computers by this. About VMG which is the administrative information for DVD reproductionthe information concerning an extension file is made not to be recorded at all to recording administrative information so that it can recognize and access also about an extension file. In this processingas shown in drawing 8the system controller 10 creates UDF by reproduction of UDF by a computerso that only an extension file may be displayed on another folder which is the same hierarchy as the title by DVD. About the information for middle management mentioned above about drawing 7description of the address information of a file name and a recording positionetc. is omittedand UDF is created. It cannot be overemphasized like files which constitute a titlesuch as VTSI and VTSM VOBSthat UDF is created for each extension file accessible. Therebyin this embodimentwhen playing by computerit is made not to show it to a user by playback of the optical disc 2 in a computer about the file of temporary middle management information which is meaningless in any wayand is made as [improve / that part and user-friendliness].

[0078]In the optical disk unit which plays the conventional DVD by theseonly the dynamic image file recorded on the optical disc 2 by record of VMG is played. On the other handin this optical disk recording / playback equipment 100 the system controller 10In step SP3 of drawing 3the data of UDF and VMG is acquiredit is made as [control / the whole operation] so that each file may be accessed by UDF about an extension fileand it is made as [reproduce / about an extension file / it / by this]. In this drawing 8Root is a root directoryVIDEO TS is a folder of an animationand DSC is a folder of an extension file. DSC0001 and DSC0002

are extension filesrespectively.
[0079]By thesein optical disk recording / playback equipment 100. As reproduction of the animation in the conventional optical disk unit is not affected at all in this casewith the file by the animation by DVD format video. It is made as [record / with the information for middle management / the file by the still picture which is not defined depending on DVD format video].
[0080]In doing in this way and recording an extension filein the system controller 10the administrative information on each file is recorded on a memoryand is saved.
[0081]On the other handin a FAINA risethe data of UDF and VMG is generatedthe data of these UDF and VMG is recorded on the field secured by paddingand UDF and VMG are generatedand a lead-in groove and lead-out are created. It is made as [record / refreshable / refreshable / depending on the optical disc which supports a computer and an extension file by thisrecord an animation and an extension fileand / depending on the optical disk unit of the conventional DVD / only an animation / administrative information].
[0082]Drawing 9 is a flow chart which shows the recording processing procedure mentioned above about drawing 4. If this recording processing procedure is startedthe system controller 10 will move to step SP12 from step SP11and will be judged in what requires directions of record by a user for record of an animationthe thing concerning record of a still pictureand the thing concerning processing of a FAINA rise.
[0083]In the case of what requires directions of record by a user for record of an animation herethe system controller 10 moves to step SP13 from step SP12and it is judged whether the start of record was directed by the user. If an affirmation result is obtained that the system controller 10 will repeat [for] step SP13 if a negative result is obtained hereit will move to step SP14 from step SP13and live data will be recorded as drawing 4 was explained. If it furthermore moves to step SP15it judges whether the stop of record was directed by the user and a negative result is obtained hereit will return to step SP14. Therebythe system

controller 10 repeats the procedure of step SP14-SP15-SP14if live data are recorded and an affirmation result is obtained by step SP15 one by onewill end record of live data and will complete record of VTSTTVOBS.

[0084]Thenthe system controller 10 moves to step SP16it forms VTSI BUPVTSIand VTSM VOBS one by onerecords one VTS by thismoves to step SP17and ends this procedure.

[0085]On the other handby a userwhen directions are record of a still picturethe system controller 10 moves to step SP18 from step SP12and it is judged whether the start of record was directed by the user. If an affirmation result is obtained that the system controller 10 will repeat [for] step SP18 if a negative result is obtained hereit will move to step SP19 from step SP18and as drawing 4 was explainedthe extension file by a still picture file will be recorded. If it furthermore moves to step SP20it judges whether the stop of record was directed by the user and a negative result is obtained hereit will return to step SP19. Therebythe system controller 10 repeats the procedure of step SP19-SP20-SP19if a still picture file is recorded and an affirmation result is obtained by step SP20 one by onewill end record of a still picture file and will move to step SP21. The system controller 10 records middle management informationmoves to step SP17and ends this procedure here.

[0086]On the other handin record of what requires directions of record for processing of a FAINA rise by a userthe system controller 10 moves to step SP22 from step SP12and it is judged whether the start of record was directed by the user. When a negative result is obtained herethe system controller 10After performing processing of a FAINA rise as it moves to step SP23 from step SP22 and drawing 4 was explained if an affirmation result is obtained repeating [for] step SP22it moves to step SP17 and this procedure is ended.

[0087]On the other handdrawing 10 is a flow chart which shows the regeneration procedure mentioned above about drawing 4. If this regeneration procedure is startedthe system controller 10 will move to step SP32 from step SP31and will be judged in what requires directions of reproduction by a user for record of an

animationand the thing concerning record of a still picture.
[0088]In the case of what requires directions of reproduction by a user for reproduction of an animation herethe system controller 10 moves to step SP33 from step SP32and it is judged whether the reproductive start was directed by the user. If an affirmation result is obtained that the system controller 10 will repeat [for] step SP33 if a negative result is obtained hereit will move to step SP34 from step SP33. The system controller 10 controls the whole operation here to reproduce the file of the animation directed by the user on the basis of the administrative information which was recorded on the memory and held.
[0089]That iswhen the optical disc 2 is an optical disc by which FAINA rise processing was carried outthe recording position of a file corresponding with the data of VMG held in the memory is detectedand the playback from this recording position is directed to each part of optical disk recording / playback equipment 100. On the other handwhen the optical disc 2 is an optical disc by which FAINA rise processing is not carried outthe recording position of a file corresponding by VTSI of each title held in the memory and VTSTT VOBS is detectedand the playback from this recording position is directed to each part of optical disk recording / playback equipment 100.
[0090]Thusif it will judge whether the system controller 10 moved to step SP35 continuouslyand the reproductive stop was directed by the user if reproduction is directedand a negative result is obtained hereit will return to step SP34. Therebythe system controller 10 repeats the procedure of step SP34-SP35-SP34and reproduces the file of the animation directed by the user one by one. On the other handif an affirmation result is obtained by step SP35reproductive operation is endedit will move to step SP36 and this procedure will be ended.
[0091]On the other handin the case of what requires directions of reproduction by a user for reproduction of an extension filethe system controller 10 moves to step SP37 from step SP32and it is judged whether the reproductive start was directed by the user. If an affirmation result is obtained that the system controller 10 will repeat [for] step SP37 if a negative result is obtained hereit will move to step

SP38 from step SP37.

[0092]When the optical disc 2 is an optical disc by which FAINA rise processing was carried outthe system controller 10 detects the recording position of a file corresponding with the data of UDF held in the memoryand directs the playback from this recording position to each part of optical disk recording / playback equipment 100 here. On the other handwhen the optical disc 2 is an optical disc by which FAINA rise processing is not carried outthe recording position of a file corresponding from the middle management information held in the memory is detectedand the playback from this recording position is directed to each part of optical disk recording / playback equipment 100.

[0093]Thusif it will judge whether the system controller 10 moved to step SP39 continuouslyand the reproductive stop was directed by the user if reproduction is directedand a negative result is obtained hereit will return to step SP38. Therebythe system controller 10 repeats the procedure of step SP38-SP39-SP38and reproduces the file of the still picture directed by the user one by one. On the other handif an affirmation result is obtained by step SP39reproductive operation is endedit will move to step SP36 and this procedure will be ended.

[0094]In this embodimentby thesethe system controller 10The administrative information creating means which generates the administrative information on the file with which record is presented is constitutedThe DVD signal processing part 14the random access memory 15the analog-front-end part 16the motor drive control section 18the optical head 19and the spindle motor 20It is made as [constitute / the recording device which makes a group a file and the administrative information corresponding to a fileand is recorded on the user's area of the optical disc 2]. The system controller 10 constitutes this administrative information creating means and the control means which controls operation of a recording deviceFurthermorewith compression / elongation processing part 6the header information treating part 7the DVD signal processing part 14the random access memory 15the analog-front-end part 16the motor drive control section 18the optical head 19and the spindle motor 20. Thusit is made as

[constitute / based on the administrative information recorded by the group with a file / the reproduction means which plays the file of each attribute recorded on the optical disc].

[0095]In such the optical disk recording / playback equipment 100 of composition. If it is loaded with an optical disc by the user where a power supply is startedIf a power supply is started in the state where it was loaded with the optical discthe optical head 19 will move to the inner circumference side of the optical disc 2 by the drive of the thread motor 21 through the DVD signal processing part 14 by the system controller 10and the motor drive control section 18. Furthermorethe optical disc 2 is irradiated with a laser beam by the optical head 19Sequential operation of the light-receiving result by the optical head 19 of returned light is carried out with the analog-front-end part 16 and the system controller 10Processing of tracking control and focus control is performed by control of the optical head 19 through the DVD signal processing part 14 by processing of this system controller 10and the motor drive control section 18. The data recorded on the optical disc 2 is played by processing by the DVD signal processing part 14 of a light-receiving result. In optical disk recording / playback equipment 100the variety of information recorded on the inner circumference side of the optical disc 2 is acquired by this the processing of a series of with the system controller 10and is held by it at the memory of built-in in the system controller 10.

[0096]In the case of the optical disc only for playback in which this optical disc 2 was created by La Stampain the case of the optical disc in which the optical disc 2 recorded only the dynamic image file further and which comes to carry out FAINA rise processingby this processing of a series of. The data of VMG which is the administrative information for DVD brayers recorded on the inner circumference side of the optical disc 2 is acquired by the system controller 10. By this in optical disk recording / playback equipment 100. If playback of the optical disc 2 is directed by the useraccording to the data of this VMGby the drive of the spindle motor 20 through the DVD signal processing part 14 and the motor drive control section 18. The optical head 19 seeks to the recording position of

the title for which a user asksand by the light-receiving result of the optical head 19 further tracking control and where focus control is carried outSequential operation of the light-receiving result of the optical head 19 is carried out in the DVD signal processing part 14the header information treating part 7and the compression / elongation processing part 6and the video data based on an animation is reproduced. namely-- the regenerative signal with which a signal level changes according to the pit sequence of the optical disc 2 which is a light-receiving result is processed in the analog-front-end part 16and regenerative data is generated -- this regenerative data -- the DVD signal processing part 14 -- decoding and a DEINTA reeve -- error correction processing is carried out. This regenerative data by which error correction processing was carried out is inputted into the header information treating part 7a header is removed hereand the information on this header is notified to the system controller 10. By the multiplex processing section 10it is continuously inputted into compression / elongation processing part 6separate into a video data and audio informationand about a video data. The data compression by MPEG is solved by the video processing section 8and it is displayed by the monitor section 12or is outputted to an external instrument from video / encoder 13. On the other handafter data decompression of the audio information is carried out in the audio processing part 11a monitor is presented with it by the monitor section 12or it is outputted to an external instrument from video / encoder 13.

[0097]On the other handwhen it is a virgin disk which can record the optical disc 2the data of RMA of the optical disc 2 is acquired by access of the optical disc 2 at the time of starting of a power supply with the system controller 10 at the time of charge of the optical disc 2. In optical disk recording / playback equipment 100if the photographing mode of an animation is chosen by the userWhen the optical disc 2 is DVD-RWthe data of RMA is updated and the field which generates the field which forms UDF and VMGVTSI of the first VTSand VTSM VOBS is secured by padding.

[0098]When the start of recording is directed by the user in this stateone by one

from the video input section 3 and the audio input part 5 A video dataAudio information is inputtedprocessing of a data compression is performed by video processing section B by MPEG about a video dataand processing of a data compression is performed in the audio processing part 11 about audio information. Furthermoremultiplexing processing of these video datas by which the data compression was carried outand the audio information is carried out by the multiplex processing section 10and a header is added to the data of the processing result by the header information treating part 7. After the error correcting code was added in the DVD signal processing part 14 which furthermore continuesInterleave-processand coding processing is carried out and the light volume of the laser beam with which the optical disc 2 is irradiated from the optical head 19 according to the data of this processing result is started by the analog-front-end part 16Therebya pit sequence is formed in the optical disc 2 one by oneand the video data based on an animation is recorded on it one by one.

[0099]In optical disk recording / playback equipment 100if stop instruction of the record is done by the userStop control of a series of processings in compression / elongation processing part 6 grade is carried out by the system controller 10record of a video data is stoppedand the administrative information on the file by the animation which was carried out in this way and recorded is continuously recorded on an optical disc. Namelyin optical disk recording / playback equipment 100. Thusso that administrative information may be generated by the system controller 10 and it may record following a video data from the informationincluding position informationthe information on a file sizea recording dateetc.which records an animationThis administrative information is outputted to the DVD signal processing part 14it is recorded on the optical disc 2andtherebythe field of VTSI BUP is formed. VTSI of VTS which the optical disc 2 follows by padding continuously in DVD-RW etc.In [the optical head 19 seeks to VTSI which the field which generates VTSM VOBS was secured and was secured previouslyand the field which generates VTSM VOBSand] this fieldThe

same administrative information is outputted to the DVD signal processing part 14it is recorded on the optical disc 2andtherebythe field of VTSI and VTSMVOBS is formed.

[0100]Thereby in optical disk recording / playback equipment 100the video data of 1 title based on an animation is recorded. By thesein optical disk recording / playback equipment 100. When recording the file by an animationadministrative information and a file are recorded by the DVD format video which is a format which the administrative information by the administrative information by VTSIthe administrative information by VTSM VOBSa fileand VTSI BUP follows.

[0101]In optical disk recording / playback equipment 100when record of an animation is continuously directed by the usera title is recorded one by one on the optical disc 2 by repetition of the same processing. If it is when loaded with the optical disc which does in this wayrecords a title one by oneand has not yet carried out a FAINA riseThe data of this RMA with the scan of the optical disc 2 referred to with the data of RMA at the beginning. Thusthe administrative information which used the title and the group and was recorded is acquiredit is held at the memory of the system controller 10and the title which continues from the end of the title detected with the scan of this optical disc is recorded.

[0102]In optical disk recording / playback equipment 100do in this way and a title is recordedIf processing of a FAINA rise is directed by the userthe data of UDF and VMG will be generated by the administrative information which forms the title recorded on a memoryand a groupand it will be recorded on the inner circumference side field to which these were secured to the optical disc 2and a lead-in groove and lead-out will be formed. If it is in this optical disc by thisit is set up refreshable by the DVD brayer only corresponding to the usual DVD format.

[0103]On the other handwhen the recording mode of a still picture is chosen by the userin a virgin diskthe field of UDF and VMG is further secured by padding like the case of an animation by renewal of RMA held in the memory. In an optical disk unitthe operational mode of an imaging means is switched to the mode of a still pictureand the operational mode in compression / elongation

processing part 6 is switched to the operational mode of the data compression by JPEG.

[0104]When the recording start of the still picture was directed by the user in this stateafter the data compression of the video data based on the still picture inputted from the video input section 3 was carried out by the format of JPEG by the video processing section 8 of compression / elongation processing part 6Multiplexing processing is carried out by the audio information and the multiplex processing section 10 which are outputted from the audio processing part 11. Therebywith optical disk recording / playback equipment 100it replaces with the video data based on an animationthe data with which record is presented by the video data based on a still picture is generatedand it is recorded on the optical disc 2 one by one like the case where this data is based on an animation.

[0105]In optical disk recording / playback equipment 100the live data based on a still picture are recorded in record of this still picture to securing the field of VTSI and VTSM VOBS first and recording live data in record of an animationwithout securing such a field. Directions of record of the still picture which continues by a user will record the continuing still picture on the optical disc 2 similarly. The recording position of each fileetc. are recorded on ** of these records by the memory.

[0106]If only the number of files which is carried out in this way and for which it asks in optical disk recording / playback equipment 100 records the file by a still picture on an optical disc and the record stop of a still picture is directed by the change of the operational mode by a useretc.The administrative information by the recording position etc. which were held in the memory is recorded on the continuing field as temporary middle management information to a FAINA rise by these multi-files. By this in optical disk recording / playback equipment 100. When recording files other than an animationthe recording format of a file and administrative information is switched by the attribute of a file which a file and administrative information are recorded and is recorded so that it may become the order of administrative information which files and corresponds.

[0107]Thereby with optical disk recording / playback equipment 100it is recordable on the optical disc 2 also about filessuch as a still picture which is not defined by DVD format video. When the optical disk unit which supports only the usual DVD format video is loaded with the optical disc 2 which was carried out in this way and recordedWhen the administrative information recorded according to DVD format videossuch as VTSIby the search at the time of chargeetc. is detected and VTS is reproduced by this administrative informationThusit can avoid affecting reproduction of an animation at all about filessuch as a recorded still pictureand corresponding administrative information. In the optical disc which was carried out in this way and recorded by thisit becomes possible to play the file of an animation with the usual DVD player.

[0108]On the other handaccording to the optical disk unit which also supports files other than such an animationit becomes possible to reproduce also about the file of a still picture. Namelywhen loaded with such an optical disc 2in optical disk recording / playback equipment 100. The search of the original optical disc 2 is reproduced from the optical disc 2 also about the information for middle management not only on the data of VTS and VTSM VOBS but a still picture fileand it is held at the memory of the system controller 10.

[0109]A user can be provided with the title etc. of the animation and still picture which were recorded on the optical disc 2 by a user's directions by this. The dynamic image file which corresponds similarly with directions of playback by a user with having mentioned above about the optical disc only for playback with the data of VTS and VTSM VOBS when a user points to playback of an animation is played.

[0110]On the other handwhen reproduction of a still picture file is directed by the userThe recording position etc. of a file corresponding from the information for middle management held in the memory are detectedthe data recorded one by one on the optical disc 2 by this detection result is playedand it is processed by the same course as the regenerative data based on an animation. In optical disk recording / playback equipment 100in processing of this regenerative datain

processing the regenerative data based on a still pictureSo that data decompression of the video data which carried out the data compression by JPEG may be carried outProcessing of the video processing section 8 is switched by the system controller 10and checks the video data based on a still picture by the monitor section 12 by thisand it becomes possible to output to an external instrument from video / audio encoder 13 further.

[0111]If it is in the file by such a still picture etc.generallyas compared with the file by an animationto a thing with a small file sizethe middle management information which is such administrative information collects by a multi-fileis createdand is recorded with optical disk recording / playback equipment 100. Thereby with optical disk recording / playback equipment 100reduction of the record section by record of an administrative file can be reduced in recording the extension file by such a still picture file etc.

[0112]When collecting by a multi-file in this way and recordingit is made as [record / for every kind of file which is the attribute of a file / collectively]and is made as [simplify / by this / search processingthe processing in the FAINA rise mentioned lateretc.].

[0113]In optical disk recording / playback equipment 100by thesewhat is called a virgin diskOnly an animation is recordedthe file of an optical discan animationand a still picture by which a FAINA rise is not yet carried out is recordedand the file of an animation and a still picture is recorded one by one by a user's operation to the optical disc by which a FAINA rise is not yet carried out.

[0114]On the other handabout the optical disc which does in this way and records an animation and a still pictureif a FAINA rise is directed by the userThe data of UDF for computers is created by the administrative information and middle management information which were created by record of the administrative information which was acquired from the optical disc and held in the memorymiddle management informationan animationand a still pictureand were held in the memoryand this data is recorded on the field secured to the optical disc 2 a priori. The VMG data for DVD brayers is generated only from the

administrative information on a dynamic image fileand it is similarly recorded on the optical disc 2.

[0115]By this in optical disk recording / playback equipment 100. To the UDF field which is the 1st administrative information storage field of the administrative information storage fields of the optical disc 2. As opposed to being collectively recorded by the administrative information by a group about all the files recorded on the optical disc 2The administrative information by a group is collectively recorded on the VMG field for DVD which is the 2nd administrative information storage field only about the dynamic image file which is a file of the specific attribute recorded on the optical disc.

[0116]By playing the file recorded on the optical disc 2 on the basis of the VMG field which is an object for DVDwhen playing the optical disc by which the FAINA rise was carried out by this in this way from DVD brayerAbout record of filessuch as a still picturethe animation by DVD format video can be reproduced certainlywithout affecting reproduction of an animation in any way.

[0117]In playing the optical disc by which the FAINA rise was carried out in this way by computerUDF is the file management format corresponding to the file manager system of a computerand the file of an animation becomes possible [reproducing and using also about filessuch as a still picture] from the first by reproducing each file by UDF in a computer.

[0118]Namelyin above-mentioned optical disk recording / playback equipment 100. As shown in drawing 1 (A) in the DVD-RW media of a ROW methodwhile managing a DVD video file by temporary VMGI (TMP_VMGI)As extension filessuch as JPEG files other than a DVD video fileare managed using middle management information (TMP_EXTI) and it is further shown in drawing 1 (B)By adding the free space management information (TMP_SBM:Temporary Space Bitmap) used by UDF etc. to temporary VMGI (TMP_VMGI)As free space can be known by TMP_SBM also when make extension filessuch as a DVD video file and a JPEG fileintermingledit recordsfree space is managed and an extension file is deletedand shown in drawing 1 (C)Compatibility with the optical disc only

for playback is securable by processing of a FAINA rise.
[0119]It is recordable also about filessuch as still pictures other than an animationfor example by switching the format of the administrative information which is made into a file and a group and is recorded with the attribute of a file.
[0120]Namelyabout the file of an animationso that the information for backup on administrative informationa fileand administrative information may continue one by oneFurthermoreby DVD format videorecord a file and administrative information and about files other than an animation. The file which is not defined by DVD format video is recordedand it can avoid affecting reproduction of a dynamic image file at all by recording becoming the order of a file and administrative information.
[0121]It can play and use also about files other than an animation by playing the file of each attribute recorded on the optical disc based on administrative information other than the animation which was carried out in this way and recorded.
[0122]With directions by a userabout all the files recorded on the 1st administrative information storage field by the optical disc. By recording the administrative information by a group collectively and recording the administrative information by a group on the 2nd administrative information storage field collectively only about the file of a specific attributeIt enables it to reproduce an animation depending on the usual DVD playerand all the filessuch as an animation and a still picturecan be made refreshable depending on a computer.
[0123]
[Effect of the Invention]as mentioned above -- according to this invention -- an application -- it becomes possible by not depending on KESHON but holding one space management information to get to know the position which writes in VTS or a file next simply on mounting. Eliminated VTS or empty space of a file is managedand it becomes possible to realize crevice record.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a figure showing typically the fundamental record method in the case of recording by DVD format video on a DVD disk by this invention.

[Drawing 2]It is a block diagram showing the composition of the optical disk recording/playback equipment which applied this invention.

[Drawing 3]It is a flow chart which shows the procedure of the processing performed in the above-mentioned optical disk recording/playback equipment at the time of starting of a power supply.

[Drawing 4]It is a figure with which explanation of the recording processing of the dynamic image file by the ROW method in the above-mentioned optical disk recording/playback equipment and a still picture file is presented.

[Drawing 5]It is a figure with which explanation of free space management information is presented.

[Drawing 6]It is a figure showing the structure of the space bit map (SBM) which constitutes free space management information.

[Drawing 7]It is a figure with which explanation of middle management information is presented.

[Drawing 8]It is a chart with which explanation of the directory structure in an optical disc is presented.

[Drawing 9]It is a flow chart which shows the procedure of the recording processing in the above-mentioned optical disk recording/playback equipment.

[Drawing 10]It is a flow chart which shows the procedure of the regeneration in the above-mentioned optical disk recording/playback equipment.

[Drawing 11]It is a chart with which explanation of DVD format video is presented.

[Drawing 12]It is a chart with which explanation of record by an INC method is presented.

[Drawing 13]It is a chart with which explanation of record by a ROW method is

presented.

[Description of Notations]

2 An optical disc and 3 A video input section5 audio input partsand 6 Compression / elongation processing part7 A header information treating partand 9 and 15 Random access memory and 10 System controller11 A final controlling element12 monitor sectionsand 13 Video/audio encoder14 A DVD signal processing part and 16 An analog-front-end part18 motor-drive control section19 optical headsand 20 A spindle motor and 21 A thread motor61 video processing sections62 audio processing parts63 multiplex processing sections100 optical disk recording / playback equipment